

## **THE CLAIMS:**

Claims 1-14 (**CANCELLED**)

15. (**CURRENTLY AMENDED**) A nozzle for use in a fluid catalytic cracking unit comprising:

a first conduit for providing a passageway for enabling a first dispersing gas to flow therethrough;

a first cap covering the end of said first conduit, said first cap including at least one outlet passageway therethrough adapted for discharging said first dispersing gas into a liquid hydrocarbon feed material;

a second conduit enclosing said first conduit and spaced therefrom to form an annulus therebetween thereby providing a passageway for enabling said liquid hydrocarbon feed material to flow therethrough;

a second cap covering the end of said second conduit, said second cap being spaced from said first cap thereby forming a mixing zone therebetween for mixing said liquid hydrocarbon feed and said first dispersing gas and said second cap including at least one **continuous** circular slot as outlet passageway therethrough, which passageway is substantially aligned with the outlet passageway on said first cap and is adapted for discharging said mixture of said liquid hydrocarbon feed and said first dispersing gas;

~~— a third conduit surrounding said second conduit and forming an annulus therebetween for providing a passageway for enabling a second dispersing gas to flow therethrough.~~

and

**said first cap including at least one attachment to said second cap inside said continuous circular slot.**

16. (**CURRENTLY AMENDED**) The nozzle of claim 15, wherein said **continuous** circular slot includes a chamfer.

17. (**CURRENTLY AMENDED**) The nozzle of claim 16, wherein the **said** chamfer has an angle between 0° and 10° with the outlet passageway.

18. (**CURRENTLY AMENDED**) The nozzle of Claim 15 wherein the **said** outlet passageway through said second cap is adapted to discharge said mixture of

said liquid hydrocarbon feed and said first dispersing gas in a generally radial outward and upward direction.

19. **(CANCELLED)**

20. **(CANCELLED)**

21. **(PREVIOUSLY PRESENTED)** The nozzle of claim 18, wherein said upward discharge angle is in the range of about 20° to 80° from the axis of said nozzle.

22. **(CANCELLED)**

23. **(CANCELLED)**

24. **(CANCELLED)**

25. **(CANCELLED)**

26. **(CANCELLED)**

27. **(CURRENTLY AMENDED)** The nozzle of Claim 15 wherein the said outlet passageway on said first cap includes a plurality of outlet passageways for discharging said first dispersing gas into said liquid hydrocarbon feed material to form a mixture thereof, and the said continuous circular slot outlet passageway on said second cap is open along its entire circumference, adapted for discharging said mixture of said liquid hydrocarbon feed and the said first dispersing gas ~~in a single fan spray and~~ in a generally radial outward and upward direction.

28. **(CANCELLED)**

29. **(CURRENTLY AMENDED)** The nozzle of Claim 15 wherein said second cap includes a conical surface which includes the said continuous circular slot outlet passageway and said first cap includes a conical surface having at least one outlet passageway.

30. **(CURRENTLY AMENDED)** The nozzle of Claim 15 wherein the said outlet passageway through said first cap includes a plurality of substantially round holes.

31. **(CURRENTLY AMENDED)** The nozzle of Claim 15 wherein a passageway is present for enabling part of the liquid hydrocarbon feed material to be discharged in a more central position, between the said first cap and said second cap, relative to the position of the said outlet passageway of said first cap.

32. **(CURRENTLY AMENDED)** A fluid catalytic cracking unit comprising:

at least one riser reactor;  
at least one nozzle located in the bottom of said riser, wherein said nozzle comprises:  
a first conduit for providing a passageway for enabling a first dispersing gas to flow therethrough;  
a first cap covering the end of said first conduit, said first cap including at least one outlet passageway therethrough adapted for discharging said first dispersing gas into a liquid hydrocarbon feed material;  
a second conduit enclosing said first conduit and spaced therefrom to form an annulus therebetween thereby providing a passageway for enabling said liquid hydrocarbon feed material to flow therethrough;  
a second cap covering the end of said second conduit, said second cap being spaced from said first cap thereby forming a mixing zone therebetween for mixing said liquid hydrocarbon feed and said first dispersing gas and said second cap including at least one continuous circular slot as an outlet passageway therethrough, which passageway is substantially aligned with the said outlet passageway on said first cap and is adapted for discharging said mixture of said liquid hydrocarbon feed and said first dispersing gas; and  
~~—— a third conduit surrounding said second conduit and forming an annulus therebetween for providing a passageway for enabling a second dispersing gas to flow therethrough; and~~  
a regenerator standpipe through which hot regenerated catalyst enters the riser bottom region.

33. **(CURRENTLY AMENDED)** The fluid catalytic cracking unit of Claim ~~32~~ **35** wherein ~~the~~ said third conduit of ~~the~~ said feed nozzle terminates at a point above the level of the centerline of said standpipe entering the riser.

34. **(PREVIOUSLY PRESENTED)** A method of injecting feed into a fluid catalytic cracking unit comprising the steps of:  
introducing a liquid hydrocarbon feed and a dispersing gas into a feed nozzle located in the bottom of a riser, said feed nozzle comprising:  
a first conduit for providing a passageway for enabling a first dispersing gas to flow therethrough;

a first cap covering the end of said first conduit, said first cap including at least one outlet passageway therethrough adapted for discharging said first dispersing gas into a liquid hydrocarbon feed material;

a second conduit enclosing said first conduit and spaced therefrom to form an annulus therebetween thereby providing a passageway for enabling said liquid hydrocarbon feed material to flow therethrough;

a second cap covering the end of said second conduit, said second cap being spaced from said first cap thereby forming a mixing zone therebetween for mixing said liquid hydrocarbon feed and said first dispersing gas and said second cap including at least one circular slot as outlet passageway therethrough, which passageway is substantially aligned with the outlet passageway on said first cap and is adapted for discharging said mixture of said liquid hydrocarbon feed and said first dispersing gas; and

a third conduit surrounding said second conduit and forming an annulus therebetween for providing a passageway for enabling a second dispersing gas to flow therethrough;

mixing said liquid hydrocarbon feed and said dispersing gas in a mixing zone in said feed injection system; and

discharging said mixture of said liquid hydrocarbon feed and said dispersing gas from said feed injection system as a conical formed spray in a generally radial outward and upward direction.

35. **(NEW)** The fluid catalytic cracking unit of Claim 32 including a third conduit surrounding said second conduit and forming an annulus therebetween for providing a passageway for enabling a second dispersing gas to flow therethrough.